

SUPPORT FOR THE AMENDMENT

Claim 1 is amended to use wording and structure consistent with U.S. patent law practice.

Claims 6-19 are new and are supported in the specification.

Support for Claim 6 is found on page 13, lines 19-23.

Support for Claim 7 is found on page 13, lines 27-28.

Support for Claim 8 is found on page 13, lines 27-38.

Support for Claim 9 is found on page 13, line 40 bridging to page 14, line 8.

Support for Claim 10 is found on page 14, lines 11-13.

Support for Claim 11 is found on page 14, lines 15-16.

Support for Claim 12 is found on page 14, lines 24-33.

Support for Claim 13 is found on page 14, lines 35-37.

Support for Claim 14 is found on page 14, lines 39-41.

Support for Claim 15 is found on page 14, lines 41-43.

Support for Claim 16 is found on page 14, lines 44-45.

Support for Claim 17 is found on page 17, lines 19-28.

Support for Claim 18 is found on page 17, lines 33-37.

Support for Claim 19 is found on page 18, lines 5-7.

No new matter will be added to this application by entry of this amendment.

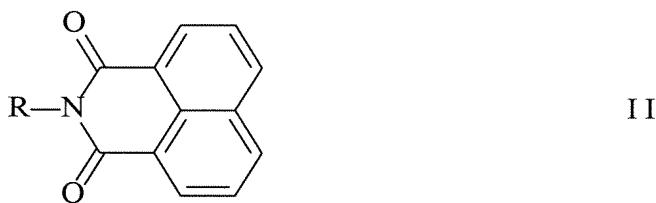
Upon entry of this amendment, Claims 1-19 are active. Claims 2-5 are withdrawn.

REQUEST FOR RECONSIDERATION

Applicants wish to thank Examiner Aulakh for the courteous and helpful discussion of the above-identified application held on October 11, 2007. At that time Applicants' U.S. representative reviewed the cited references and pointed-out the differences of the processes and results obtained thereby relative to the claimed invention. Significant improvement in yield according to the process of the claimed invention relative to the cited references was also indicated. The following is intended to reiterate and expand upon that discussion.

Perylene-3,4:9,10-tetracarboxylic diimides (perylimides) exhibit brilliant color, high fluorescence and good thermal, chemical and photochemical stability. Such materials are used, for example, in reprographic operations, electrophotography, fluorescent solar collectors, photovoltaics, chemiluminescent applications and in electroluminescent devices, among others. A method to prepare perylimides and especially perylimides having strongly sterically hindering or inert aromatic R substituents, in good yield is sought.

The claimed invention addresses this need by providing a process according to Claim 1, comprising dimerizing a naphthalene-1,8-dicarboximide of the formula II



in a substantially homogeneous reaction medium consisting essentially of an apolar aprotic organic solvent and an alkali metal base and subsequently reoxidizing the resulting alkali metal salt of the leuco form of the perylene-3,4:9,10-tetracarboxylic diimide in the presence of a polar solvent. No such process is disclosed or suggested in the cited references.

The rejection of Claim 1 under 35 U.S.C. 102(b) over Flatt (EP 0525538) is respectfully traversed.

Flatt does not disclose or suggest a method to prepare perylimides of formula I comprising dimerizing a naphthalene-1,8-dicarboximide of the formula II in a **substantially homogeneous reaction medium consisting essentially of an apolar aprotic organic solvent and an alkali metal base** and subsequently reoxidizing the resulting alkali metal salt of the leuco form of the perylene-3,4:9,10-tetracarboxylic diimide in the presence of a polar solvent.

Flatt is directed to a process for the continuous preparation of a perylenetetracarboxylic diimide comprising (a) preparing a reaction mixture by mixing a naphthalimide; at least one part by weight of one or more alkali metal hydroxides, and optionally, an alkali metal carboxylate; (b) passing the reaction mixture through a continuous reactor having one or more heated zones at a temperature of at least 130°C to form a condensation product; (c) oxidizing the condensation product in an aqueous medium; and (d) isolating the perylenetetracarboxylic diimide.

The Flatt process is clearly a **fusion process** wherein the solid mixture prepared in (a) is heated to a fusion stage (page 4, lines 26-58). Applicants respectfully submit that this reference neither discloses nor suggests the use of an apolar aprotic solvent as in the claimed invention. Applicants note that the term apolar aprotic solvent defines a solvent which is nonpolar and cannot provide hydrogen bonding. A copy of a discussion of protic and aprotic solvent is attached for the Examiner's convenience.

Furthermore, Applicants have discussed the deficiencies of the Flatt process in the specification beginning on page 2, line 31, and bridging to page 3, line 2.

Flatt states:

“The process of the invention is suited to the preparation of perylenetetracarboxylic diimides, **preferably those of Formula I in which**

both R groups are hydrogen or a metal atom (especially those in which both groups R are hydrogen). It is also possible, **but less preferred**, to prepare compounds of Formula I in which R is C₁-C₆ alkyl or C₇-C₁₅ aralkyl.” (Page 3, lines 50-53)(Bold added)

In contrast, the Applicants have demonstrated yields of 72% minimum for substituted perylimides of formula I in the Examples listed in Table 2.

In view of the foregoing, Applicants respectfully submit that Flatt can neither anticipate nor render obvious the claimed invention. Withdrawal of the rejection of Claim 1 under 35 U.S.C. 102(b) over Flatt is respectfully requested.

The rejection of Claim 1 under 35 U.S.C. 103(a) over Sakamoto et al. (J. Org. Chem. 2001, 66, 94-98) is respectfully traversed.

Sakamoto neither discloses nor suggests a method to prepare perylimides of formula I comprising dimerizing a naphthalene-1,8-dicarboximide of the formula II in a **substantially homogeneous reaction medium consisting essentially of an apolar aprotic organic solvent and an alkali metal base** and subsequently **reoxidizing the resulting alkali metal salt of the leuco form** of the perylene-3,4:9,10-tetracarboxylic diimide in the presence of a polar solvent.

Sakamoto is directed to a process for the direct coupling reaction of 1,8-naphthalimide compounds **without the intervention of the leuco form dyes** in the presence of base complex reagent, t-BuOK/**1,5-diazabicyclo[4.3.0]non-5-ene (DBN)** to give the corresponding perylene dyes.

Applicants respectfully note that Sakamoto requires the base DBN and does not describe a reoxidation as in the process of the claimed invention. The chemical structure of DBN is indicated in the attachment reproduced from Wikipedia. Clearly this material is not a component of the reaction medium of the claimed invention.

Moreover, Sakamoto describes on page 95, in the first two paragraphs of the left column, the testing of other base combinations, but only the *t*-BuOK/DBN combination was found effective in promoting the direct coupling to the perylene dye, without formation of the intermediate leuco form.

Applicants respectfully submit that comparison of % Yield data for like products between the results of Sakamoto as indicated in Table 1 and the claimed invention in Table 2, shows significant improvement in yield with the claimed invention. The data is collected in the following Comparison of Yield Table.

Comparison of Reported Yields Table

<u>R</u>	<u>Sakamoto</u>		<u>Claimed Invention</u>	
	<u>Product</u>	<u>Yield</u>	<u>Example</u>	<u>Yield</u>
Phenyl	2e	47%	46	86%
			47	84%
Benzyl	2h	52%	76	79%
			77	78%

The results indicate that in those examples where direct comparison is possible, the process of the claimed invention is significantly improved in yield by at least 50% over the process of Sakamoto.

In view of the foregoing, Applicants respectfully submit that Sakamoto neither anticipates nor renders obvious the process of the claimed invention. Withdrawal of the rejection of Claim 1 under 35 U.S.C. 103(a) over Sakamoto et al. (*J. Org. Chem.* 2001, 66, 94-98) is respectfully requested.

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Reply to Office Action of August 29, 2007

The objection to the abstract is obviated by appropriate amendment. The abstract is herein amended to comply with 37 CFR 1.72 (b).

Applicants respectfully submit that Claims 1 and 6-19 are now in condition for allowance and early notice of such action is earnestly solicited.

Respectfully submitted,

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